



September 2011

- 6** Viewing the Universe with Telescopes. 5-8 pm
- 22** StarLab and Space Place. 5-8 pm
- 28** Fly By Math and Physics of Flight 5-8 pm

October 2011

- 11** Basic Rocketry 5-7pm
- 22** Intro. to Model Rocketry 10 am-4pm
- 27** Robotic Explorations and WeDo Robotics. 4-8pm

November 2011

- 9** Fascinating Flight . . 5-8 pm
- 15** Making the Invisible Detectable and Remote Sensing. 5-8 pm

December 2011

- 7** Plants in Space: Hydroponics & Lunar Growth Chambers. .5-8 pm
- 13** Kindernauts, Echo the Bat, and Amelia the Pigeon 4-7 pm

January 2012

- 14** Robots and Ratios 10 am-4pm
- 16** Robots and Ratios Part #2 10 am-4pm
- 28** StarLab and Telescopes 4-8pm

February 2012

- 11** Robotic Explorations and We Do Robotics 10am- 4pm
- 16** NASA Games 4-7pm
- 20** NASA Virtual Worlds 10am- 4pm

March 2012

- 7** Lunar/Meteorite Certification 5-8 pm
- 10** Robots and Ratios 10am- 4pm
- 21** Sun Earth Day Celebration. tbd

April 2012

- 11** Intro. to GPS 5-8pm
- 17** Basic Rocketry 4-7pm
- 21** Hydrogen and Solar Energy 10am- 4pm

May 2012

- 5** After School Universe 10am- 4pm
- 19** Globe, Probe, and GIS 10 am-4pm

June 2012

- 6** Transit of Venus tbd



All above workshops are held at NASA IV&V Fairmont, WV

**Lat/Lon
N 39.43086
W 80.19661**

NOTE:

- These workshops will certify educators to sign out a corresponding classroom kit for up to **2 weeks**.
- New workshops are always being added to our online calendar.
- These workshops are held at the ERC.

Grades: **E**= Elementary **M**= Middle **H**= High

Afterschool Universe (M)

AU is a 6 hour workshop that teaches about black holes, galaxies, composition and scale of the universe, and the lives of stars. These topics are covered using hands-on and kinesthetic modeling activities that keep students engaged and active participants in learning about the universe. AU is great for the classroom or afterschool programs.

Basic Rocketry (E, M)

Basic Rocketry provides hands-on instruction for building four types of rockets to teach rocketry concepts and Newton's Laws of Motion. The included Rocket Educator Guide provides even more activities.

Cratering (M)

Control the variables of impact craters including size, mass, velocity, and angle! Become certified to borrow our class set testing apparatus to recreate the cratering processes in our Solar System. The Educator Guides are included.

Echo the Bat (E)

Explore how bats use remote sensing and relate it to how satellites use remote sensing. Hands-on activities about light, bats, communication, an interactive DVD, and trade books are included in the kit.

Energy Series (M,H)

The Energy Series workshops are based on materials and teacher/student guides from the National Energy Education Development Project (www.need.org).

- **Science of Energy:** This is first in the series and builds the foundational knowledge of energy types and transformations through hands-on activities.
- **Hydrogen:** Learn NEED's *H₂ Educate* materials, generate H₂, build and run fuel cell cars and MORE.
- **Solar:** Enable learners to explain the differences in series and parallel circuits, construct photovoltaic arrays, and understand PV as an energy source.
- **Wind:** Use activities from the *Kid Wind Project* to dispel myths about wind energy and electricity and learn to conduct your own "Spin Off" competition.

Engineering Design Challenges (M, H)

Learn the engineering design process used by NASA engineers to complete model design challenges to solve real life problems you can run in the classroom.

- **Spacecraft Structure:** The structural elements that hold together an aerospace vehicle must be strong and light to minimize the fuel needed. Build a thrust structure to launch a 1-liter bottle "rocket".
- **Thermal Protection System:** Space vehicles have thermal protection systems to protect against the heat of re-entry into Earth's atmosphere. See if you can build a model to withstand a propane torch.

Fascinating Flight (M, H)

Use the engaging topic of flight to introduce your students to basic physics principles like weight and balance, Newton's Laws of Motion, and Bernoulli's Principle. The Mid-Atlantic Aerospace Complex (MAAC) will provide hands-on ways to teach these topics as well as discuss aerospace related career information and opportunities available for educators and students.

**Fly by Math (M, H)**

Learn to engage students in pre-algebra and careers with the FAA as they act out the roles of pilots, air-traffic-controllers, and scientists to determine the safest flight routes for aircraft by solving distance-rate-time problems.

Imagine Mars (E, M)

Learn this national educational initiative that leads learners to create a futuristic Mars community as they explore their local community. Covers math, science, social studies, and language arts CSOs.

Intro. to GLOBE, Probes, and GIS (M, H)

Learn to use Pasco Probes to measure air and water temperature, dissolved oxygen, conductivity, pH, barometric pressure, relative humidity, latitude, longitude, and elevation AND how to transfer the data to a Geographic Information System (GIS) designed specifically for use in K-12 settings with a few simple clicks.

Intro. to GLOBE and Surface Temperature (M, H)

Learn about the world-wide GLOBE Program and be certified to use the Surface Temperature kit which includes eight handheld Infrared Thermometers (IRT), Thermal Shock covers, rulers and more to allow a class to collect and report GLOBE Surface Temperature data.

Intro. to GPS (M, H)

Handheld GPS units can be used as a classroom tool to teach mathematics, geography, and science. Topics covered include the science behind GPS, geo caching, how to use the GPS units, and an engaging lesson to determine the size of the Earth.

Intro. to Model Rocketry (M, H)

Learn to design and build a model rocket capable of achieving heights up to 300 meters (yours to keep). Also use RockSim software (receive a free trail CD), and learn of rocket competitions for your learners.

Kindernauts (E)

Great activities for young learners to get them excited about space. Six units-Rocket Math, International Space Station, Living in Space, Space Suits, Careers, and Solar System and Stars cover over 40 CSOs. It is full of great stuff such as wearable space suits!

Making the Invisible Detectable (ALL)

We only see a small portion of the Electromagnetic Spectrum. Explore the many other wavelengths (radio, IR, UV, X-ray waves, and gamma rays) that are part of our everyday lives by using hands-on activities to discover the properties of these wavelengths. Activities include using the IR Thermometers, spectrosopes, black lights, ceramic bulbs, posters, DVDs, and much more.

Physics of Flight (H)



Learn the physics of flight from the MAAC and NASA through lessons using balsa aircraft as tools to teach the concepts of force and motion, potential/kinetic energy and centripetal force. The activities allow students to practice important math skills to determine average speed and distance flown. Kit includes planes, winders, competition rubber bands, and more.

Plants in Space: Hydroponics (M, H)

In support of the Lunar Plant Growth Chamber in Space educator guides, this kit includes three compact hydroponic sets (which are custom built hybrid Water/ Nutrient Film Technique models) each capable of growing 18 plants that include everything students need to explore the variables of nutrient loads, temperature, light intensity, light wavelength, and more.

Remote Sensing and Dinos (E)

Proportional dinosaur models, dino claws, eggs, and teeth, are used with fossils, lesson plans, trade books, videos, and a variety of other materials to enhance a unit on dinosaurs based on a kit from the Carnegie Museum of Natural History.

Robotics Explorations/ LEGO WE DOs (E)

Build a series of robotic animals! A robotics workshop for K-6 grade educators uses robots designed for young learners to explore cross-curricular themes while developing skills in science, technology, engineering and math.

Robots and Ratios (M, H)

Learn to program LEGO robots using MINDSTORMS NXT-G software, use proportional mathematics, Video-based Science and Engineering curriculum to help teach math, science, and 21st Century Skills.

StarLab and Space Place (E, M)

Learn to use the StarLab, a portable planetarium, along with classroom activities from NASA's Space Place website to teach about constellations, the moon, weather, plate tectonics and much more.

Sunspotter (E, M)

This Keplarian telescope allows students to safely view the sun, eclipses, and to track the location and motion of sunspots, transits, and more.

Viewing the Universe (M, H)

Learn to use manual and computerized telescopes to teach students about the universe. See mountains and craters on the moon! See the rings of Saturn! See the moons of Jupiter! Activities and lesson plans are included for day and night use. Attendees will be certified to check out the ERC's 14 telescopes.

NEW WORKSHOPS!

NASA Games (ALL)

Learn about space in an exciting interactive gaming environment! NASA games are introduced with ways to use them in educational settings. Highlighted will be Selene and Station Spacewalk. Selene players construct the Earth's moon, then pepper it with impact craters and flood it with lava flows. Empirical research shows Selene prepares learners to achieve state and national educational standards. Station Spacewalk features simulations of actual EVAs conducted by astronauts to provide power to the space station.

NASA Virtual Worlds (M, H)

NASA is reaching out to students and teachers through free, three-dimensional, online communities such as Second Life. Come learn how your class can complete a mission on the lunar surface through MoonWorld (developed at the CET), mingle with scientists from NASA's Jet Propulsion Laboratory on Explorer Island, visit an interactive planetarium with real-time showings of constellations and see a model of the Martian surface that was created using actual NASA Data.

Robots and Ratios Part #2 (M, H)

If you have already completed the ERC's Robots and Ratios workshop then you are ready for the next step! Learn advanced NXT programming techniques including math and logic functions, how to program the color sensor, and how to collect and graph temperature data using the LEGO's Science and Data Logging Software. Finish the day by programming your robot to play robot soccer using an IR-emitting and IR seeking sensor.



NASA Educator Resource Center Network (ERCN) 2011-2012 Online Workshops for Educators

The NASA ERCN offers **free** online NASA education workshops for teachers. You only need an internet connection and audio capability to participate. Go to http://www.nasa.gov/centers/ivv/education/erc_index.html and click **workshop registration** to sign up for a webinar. Registered participants will receive login instructions via email prior to each workshop and a certificate of participation following the workshop as well as access to the archived presentation.

NASA's Space Place

Saturday September 10, 2011, 8:00—9:30 a.m., AZ (11:00 Eastern)

Explore a NASA education resource that makes science, technology, and learning about space fun and understandable. Learn about the wealth of hands-on activities, interactive games and puzzles, and animations that help to bring space science alive for students. *Presented by: Lindsey B. Keith-Vincent, Museum Educator—The IDEA Place*

Solve Challenges of Space through a NASA Engineering Design Challenge

Saturday October 15, 2011, 8:00—9:30 a.m., AZ (11:00 Eastern) Grades 7-12

The RealWorld-InWorld (RWIW) NASA Engineering Design Challenge invites students in grades 7-12 to work as engineers and scientists to solve NASA-related real-world problems. Students may choose to design solutions related to the James Webb Space Telescope or Robonaut 2. Teams first complete their designs in the RealWorld, then team with college engineering students and work InWorld, a virtual world setting. InWorld, students use 21st-century tools to refine and create 3D visual models of their designs. RealWorld? InWorld? Learn how to use ALL words to engage and inspire students through this innovative challenge. *Presented by Sharon Bowers, Project Manager, RWIW NASA Engineering Design Challenge—National Institute of Aerospace Educator-in-Residence*

Introduction to GPS

Saturday November 12, 2011, 8:00 —9:30 a.m., AZ (10:00 Eastern) Grades 5-9

The Global Positioning System is an engaging educational tool for teaching students science, mathematics, and technology. This session will introduce teachers to the science behind GPS, will contain engaging activities including determining the size of the Earth, and will cover associated NASA resources to aid in teaching GPS to students. *Presented by: Todd Ensign—NASA IV&V ERC*

Galaxies: 101

Saturday December 10, 2011, 8:00—9:30 a.m., AZ (10:00 Eastern)

Our home, the Milky Way Galaxy is but one in a sea of galaxies known as the Universe. Join us as we explore the visible lives of galaxies, their characteristics, naming conventions, components and clustering, as well as how galaxies formed and galactic collisions. Learn too about the hidden lives of galaxies, including what we can't see, the ever elusive dark matter. Workshop includes classroom activities to engage students in the topic of galaxies. *Presented by: Stacy DeVeau—Arizona ERC.*

Flight and Bernoulli

Saturday January 14, 2012, 8:00—9:30 a.m., AZ (10:00 Eastern)

Learn all about using methods of scientific discovery. We'll explore flight, from balloons and birds, to the future of flight and flex wing planes. Using Bernoulli's principle, your students can experiment and learn how and why things fly. *Presented by: Virginia Air & Space Center*

Podcasting:101

Saturday January 28, 2012, 8:00—9:30 a.m. AZ (10:00 Eastern) Grades 4-12

Dispel the myths of podcasting and learn to find, manage, and use dozens of brand new NASA podcasts effectively in your classroom. We will demonstrate just how easily your students can create online scientific multimedia productions using NASA resources. *Presented by: Todd Ensign—NASA IV&V Facility ERC*

Glass and Mirrors

Saturday February 11, 2012, 8:30-10:00 a.m., AZ (10:30 Eastern)

Telescopes have tremendously expanded both our view and knowledge of the universe using some pretty simple equipment— glass and mirrors. Although telescopes may seem complicated, they aren't. Join us to learn the science of how and why telescopes work and how you can engage students in understanding the science behind them in your very own classroom. *Presented by: Debra Homeier: Seaborg Mathematics and Science Center ERC, Northern Michigan University; Scott Stobbelaar: Seaborg Planetary Specialist; and Chris Standerford: Shiras Planetarium Director*

Life on Earth...and Elsewhere?

Saturday March 3, 2012, 8:00—9:30 a.m., AZ (10:00 Eastern)

What is life? Where can it exist? Is there life on other planets outside of our own solar system? Learn about how NASA is searching for Earth-like planets orbiting Sun-like stars and what conditions are required to support life elsewhere. Discover ways to engage students with the nature of life and the search for life elsewhere in the universe. *Presented by: Stacy DeVea—Arizona ERC*

Robotic Explorations

Saturday March 24, 2012, 8:00—9:30 a.m., AZ (10:00 Eastern) Grades K—8

Join us to learn ways to introduce robotics in the classroom. Using simple materials you can create ten stations that allow students to explore aspects of robotics and how NASA uses them in a variety of robotic applications. Students will develop their own definition of a robot and refine it as they progress through stations. From building and using three types of end effectors for robotic arms to discovering why certain landing sites were chosen for Mars rovers, students will have fun while learning about robotics. *Presented by: Pam Casto and Amy Phillips—NASA IV&V ERC*

Bring Hubble Space Telescope Discoveries to Your Classroom

Saturday April 21, 2012, 8:00—9:30 a.m., AZ (11:00 Eastern)

Bring the wonders of the universe into your classroom. Learn about select Hubble education resources available for instructional use. Staff from STScI will explain how to investigate the latest scientific discoveries from Hubble into instruction using curriculum support tools available on the Amazing Space website. *Presented by: Space Telescope Science Institute, Office of Public Outreach*

STARLAB Extravaganza

Saturday May 19, 2012, 8:00—9:30 a.m., AZ (11:00 Eastern)

Excite students by letting them become the teacher inside inflatable planetariums such as STARLAB. This webinar provides information on how to engage students with the classroom activities prior to the dome experience, how to share the role of teacher with students inside the dome, and includes follow-up activities that keep students actively engaged. "Pre," "During," and "Post" activities will be presented for a variety of planetarium themes as well as how this approach can be applied to other topics. *Presented by: Pam Casto and Amy Phillips—NASA IV&V ERC*

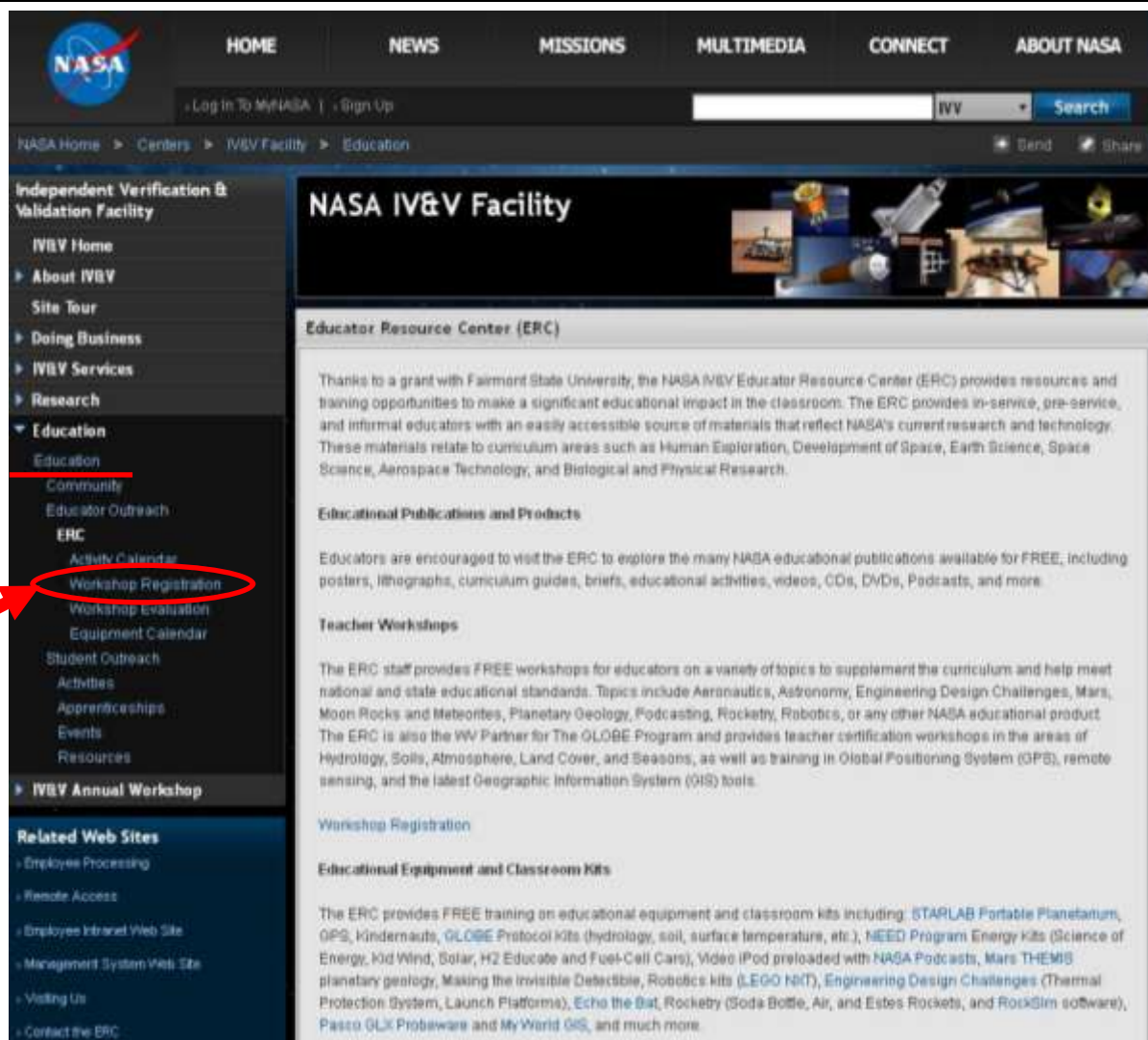
Plants in Space

Saturday June 2, 2012, 8:00—9:30 a.m., AZ (11:00 Eastern)

Discover the need for plants in space. Plants are at the very foundation of the system of life. Learn how to grow plants in space, and the difference between plants grown on Earth and in space. Does gravity affect plants and how does that change in space? Discover the uses of plants and algae in the future of space exploration and how you can engage students with this topic. *Presented by: Virginia Air & Space Center*

To Register for an ERC Workshop:

- Go to <http://erc.ivv.nasa.gov>
- Then click on *Workshop Registration*



To request a workshop in your area, register for a workshop being hosted near-by, check on equipment availability or inquire about student programs, contact the appropriate ERC staff:

Program Manager:	Todd.Ensign@ivv.nasa.gov	304-367-8438
Education Specialist:	Pam.Casto@ivv.nasa.gov	304-367-8436
Equipment Loan:	Josh.Revels@ivv.nasa.gov	304-367-8251
Student Programs:	Amy.Phillips@ivv.nasa.gov	304-367-8379

NASA IV&V ERC, 100 University Dr., Fairmont, WV 26554

The ERC is managed by a grant from NASA IV&V through Fairmont State University under the supervision of Dr. Deb Hemler. Deb.Hemler@fairmontstate.edu

